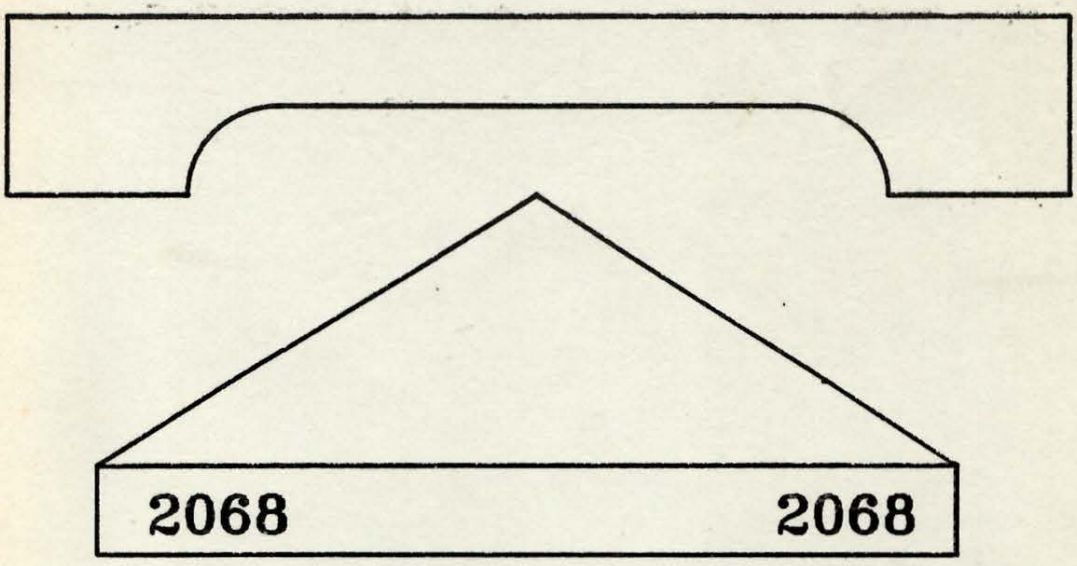
TIMEX/SINCLAIR SMART TERMINAL TELECOMMUNICATIONS



by BARRY CARTER

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TIMEX/SINCLAIR

SMART TERMINAL

TELECOMMUNICATIONS

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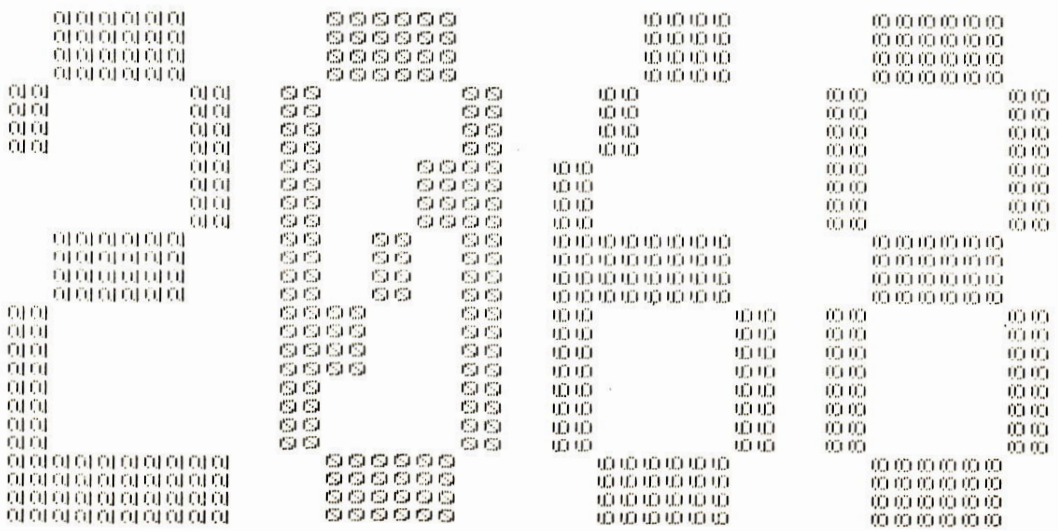

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*ACKNOWLEDGEMENT

This manual is dedicated to all Timex/Sinclair people who have endured the flustrations of having to petition and beg for software support. If you are still using Timex/Sinclair computers in spite of that, you have the patience of Job!

But all is not lost. This manual was prepared using the following configuration:T/S 2068 computer, Epson RX-80 printer with AERCO interface, and Textwriter 2000 Plus Wordprocessor. It really wasn't that awfully bad!

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*DISCLAIMER

This user's guide is applicable to the Timex/Sinclair 2068 computer and the Westridge 2050 modem only. The contents of this guide result from the author's research and experiments toward uncovering the power of Smart II telecommunications software. This manual was written to supplement the Mterm II software manual for the Timex/Sinclair 2068 Personal Computer. The author wishes to thank the Zebra Bulletin Board users and Micro-Systems Software Technical support for providing the catalyst that prompted me to write this guide. The contents will hopefully relieve many flustrations from using smart II, and provide a key to unlock its power.

*INTRODUCTION

Technical writing is a specialized field for journalists. Many are involved in translating technical detail and jargon for deciphering by the less trained general public. In most cases these writers are not technical people who have in depth knowledge of hardware or software being written about. If they are technical people, they don't know how to write for people of limited or no computer expertise. The result is an instruction manual accompanying the hardware or software that is more like a "table of contents" rather than a "hold me buy the hand" explainer of things! Or what's more often the case than not, the hardware (e.g. computer, modem,etc.) producer may contract out the software to supplier A; and contract the software user instruction manual to supplier B. And guess what, supplier's A and B may not be aware of each other's existance!

It's unfortunate that computerists may suffer in this display of juggling the software and software documentation. The fault is not restricted to the little guys, as many corporate giants are just as guilty. The attitude that the software will sell itself is too prevalent in the industry. But luckily there still enough pioneers around who feel compelled to look out for the neophyte and less inquistive user. It was with this dedication that this manual was prepared.

This is a Timex/Sinclair 2068 computer users manual which explains the key features of a very powerful telecomputing software package. With this manual, the reader will be able to understand how Mterm Smart II works and conduct his own creative experiments.

The primary key to overcoming telecomputing phobia is learning the terminology and protocol of other computers. With this background the user will be literate enough to use any computer or modem combination sans fear.

The telecommunications arena is busting at the seams with the enthusiam of new and experienced computer users! The combination of a Timex/Sinclair 2068 computer, Westridge 2050 modem, T/S 2040 printer, and Smart II software;provides a powerful lowcost package for becoming literate in this age of exploding information. The authors task will be completed if this manual facilitates the readers work in accessing and processing that information.

* FEATURES

The practical side of telecommunicating involves conducting business in as short a time span, with the intention of maximum gain. One wishes to get off-line in minimum time. The key to accomplishing this is planning prior to logging on;and having through familiarity with the computer information source or Bulletin Board Service(BBS) protocol, parameter settings, and upload & download procedurals. The following list of smart II features provide tools to accomplish this:

*USER FRIENDLY, MENU DRIVEN

*AUTOMATIC ANSWERING

*AUTOMATIC DIALING

*27K SEND/RECIEVE BUFFER

*MACRO KEYS

*UPLOAD/DOWNLOAD CAPABILITY

*PARAMETER SETTINGS & BUFFER SAVEABLE TO TAPE

*HEX & REM CONVERSION ROUTINE

Each of these features will be covered in detail, with expanded applications available in the appendicies.

*USER FRIENDLY MENU DRIVEN

User friendly is a much over used term, especially if the software documentation fails to adequately support the software. Since telecommunications via home computers is a wholly seperate entity in computing , it has its own vocabulary. Thus a necessary part of any good terminal program is providing instructions which assume the reader is not familiar with telecommunications jargon. The power of the Smart II terminal program can be realized by objectively reporting on each of the program features with detailed explanation;complete with examples to stimulate the imagination for applications geared to specific purposes. Terms like obvious, straight foward, simple, etc., are to be avoided.

The Smart II program is structured so that menus are provided to aid the user in selecting each option available to him. As each menu set of options is provided for in the top half of the screen, the lower half continously displays those parameters that are essential for upload/download programs, and specifying protocol

for information sources.

*AUTOMATIC COMPUTER ANSWERING

The ability of your T/S 2050 modem to auto-answer if someone calls it is a bonus application feature. When the 2050 modem detects an incoming phone signal, it automatically answers for a short time awaiting a carrier(1270 cycle tone)signal. If it recieves the carrier tone(shown by connect prompt on monitor and lighting of LED on 2050) then a connect is made. If not, the modem hangs up! With this capability, your computer can act as a host. The Smart II software will allow the posting of bulletins and messages to callers, but not conversational mode communication. The Smart II software is not a BBS. Of course since all information will be stored in user memory(RAM), the 2068 must be left on all the time. The auto answer feature is mainly a bonus in the communication between two computer users. Smart II will support both manned and unmanned operation if your computer acts as host.

For manned operation your set-up should be as follows:

a. Load Smart II program.

b. Make sure calling computer agree with you protocol parameters.

c. Set BUF:open,XMIT:off,CON: none, if you wish to capture a text file.

d. Set BUF:closed,XMIT:on, CON:none, if you wish to transmit text(CON:hex otherwise) to another T/S 2068. Here one can transmit text files or basic programs from the buffer contents of text from macro-keys. This procedure is also known as uploading(see glossary).

e. When the phone rings the modem will answer and make connection after about three rings. Follow the procedure in (c) or (d) afterwards.

For unmanned operation, your set-up should be as follows:

a. Follow procedures (a)&(b) above for manned operation.

b. Set BUF:open,CON:hex(none if another 2068 calls).

c. Set BUF:closed,XMIT:on, CON:hex. When the modem answers it will send a macro-key zero automatically(see macro-key section) if a control-E is recieved.

*AUTOMATIC COMPUTER DIALING

Autodialing means using your T/S 2068 keyboard to dial phone numbers thru the 2050 modem instead of thru your phone. This may be a minor convenience, especially with the availability of low-cost pushbutton phones incorporating both pulse and tone dialing, last number re-dial, and multimemory features. The re-dial feature allows the re-dialing of the last number called with the press of a single button. Still, pushing a button repeatedly on a busy signal can be a nuisance. Some terminal programs handle this by allowing automatic repeated redialing until a connect is made. Smart II does not have this feature. Connection with another computer with the 2050 modem is accomplished using one of the following three methods:

> AUTODIALING DIRECTORY

> T/S 2068 KEYBOARD DIALING

> MODEM COMMANDS

AUTODIALING DIRECTORY

This feature allows storing up to 14 phone numbers(accessible by pressing letter(s) A thru N) with associated attributes per Smart II program. The storage of additional sets of phone numbers is possible by configuring additional customized Smart II programs.

>EXAMPLE:

Go to Smart II main menu and press <C> option to initially set your customized phone directory. For the first entry select <A> on the prompt and <ENTER>. The following listing is displayed:

```
  MTERM TELEPHONE ENTRY: A
Name:

Number:

Serial parameters:
 5,N,1

Macro key:
 P

Press  A:to change name
       B:to change number
       C:to set serial parameters
       D:to set macro key
```

From which we show the following EXAMPLE entry:

Name:Zebra BBS

Number:7182962229

Serial parameters:7,E,1

Macro key:1

Each macro key(0 to 9) allows the entry of 53 ASCII characters per key for a total of 530 bytes of text attributable to dialing directory key "A". To set macro key return to System menu and hit<M> key. In the above example we might input the following for macro key 1(see section on macro keys for complete explanation) to reply to a BBS prompt(s):

M:Text? Larry Carl;''Dragon;

After settings are complete for dialing directory option A, hit <Enter> for main menu. Select <C> option again to continue if more entries are required.

To dial the information source, return to main menu and select <A> option for the dialing menu(A thru H). In example, push <A> then <Enter>. The phone number is automatically dialed and if a connect is made, the system will go into the terminal mode; and macro key 0 sent. Hit <Shift> and <8> followed by the number(1-9) to manually send a macro key. The macro key contents will be automatically transmitted. Note:Macro 0 is automatically sent by Smart II as entry required for some systems.

TIMEX 2068 KEYBOARD DIALING

This mode allows using the T/S 2068 keyboard to dial an information source via the modem rather than thru the telephone. Since the 2068 dials in a pulse dialing mode, the method is slow and offers little convience; thus is not recommended. To use this dialing mode, go to the main menu and use the 2068 keyboard like a pushbutton phone to dial the number. Press <Enter> to initiate dialing. Once the modem has connected with the host computer(connect is displayed on screen), it will automatically go into the terminal mode.

MODEM COMMANDS

This mode is the most versatile of the three options. The use of the autodialing directory is fine for frequently called numbers where the protocol is consistant(e.g. BBS, information sources). But when one is experimenting, BBS hopping, or

conducting computer to computer dialogue; the modem command thru your telephone is preferred.

In order to make this mode easier to use, its recommended that one use a dedicated phone for telecomputing. A phone which incorporates tone dialing, last number re-dial, and can access MCI or Sprint type services(note: Panasonic models KX 2010, 2220, 2130 or equivalent is an excellant choice)is suggested.

To access this mode, press <Enter> and <caps shift> keys at the same time; from which the prompt Modem cmd? will be displayed. Type in <m>, then using your telephone dial up the phone number and listen for the carrier tone. When the tone is detected, hit the 2068 <Enter> key and look for the carrier detect LED on the 2050 modem to light. When a connect sign is displayed on the screen, hang up the phone. If the line is busy, you can re-dial and repeat the above procedure.

*27K SEND/RECIEVE BUFFER

One of the remarkable features of smart II that makes it worth its weight in gold is the 27K(27,256 bytes) buffer. This buffer is hefty in size for a computer with only 39K of user RAM! In order for a smart terminal program to download data from a host computer, a buffer is necessary to provide a temporary place to store the incoming characters. At the end of the transmission, the character information can be viewed on the screen, printed on T/S 2040, or saved to tape. Another nice feature of Smart II is that the user has complete control of the buffer and what goes into it; arising from the ability of the user to manually open and close the buffer.

The buffer menu display is

B:To toggle buffer
E:To erase buffer
T:To transmit buffer
V:To view buffer
X:To toggle conversion

<Enter> for main menu

Pressing <B> allows one to toggle the buffer ON and OFF. In autobuffer mode a host computer can automatically open and close the 2068 buffer during a download.

The main parameter menu has a column listing of buffer status symbols defined as follows:

>BUFTOT: Total buffer capacity in bytes.
>BUFUSD: Total buffer used(e.g. amount of information captured as a result of a download).
>BUFFRE: Amount of free buffer, where BUFFRE=BUFTOT-BUFUSD.
>BUFXMT: Buffer transmitted.
>BUFPND: Buffer pending = BUFUSD-BUFXMT.

Since the buffer is like a temporary storage tank for incoming or outgoing data, several things can happen to the character data if the conversion(CON) parameters are incorrectly set. Smart II has three types of buffer conversion. HEX, REM, and None. The proper settings will be determined by the type of data(ASCII, binary, token basic) involved, and the nature of the host computer(BBS, information source, or another 2068). The details on setting conversions are covered in the upload & download sections.

Assuming the buffer contents are satisfactory, one can choose to display, print, or save the buffer contents to tape. This is accomplished by going to the buffer menu and pressing <V>. The prompt of either <D> to view buffer on screen or <P> to print on 2040 printer is selected. To save the buffer contents to tape, set parameters BUF:open, CON:none. Exit to basic from main menu and use the save command the same way you would if a basic program was being saved. For example, Save "zebra", etc.

One can inspect the buffer contents by exiting <E> to basic from the main menu, or by viewing <V> the buffer from the buffer menu. One curiosity is the difference between a basic program(captured from a download) in the buffer versus what's viewed in the basic program area. The most obvious is the changes to the line numbers. A little study of the T/S 2068 basic program line data structure should shed light on this observation. Since data coming thru the buffer is ASCII code, when its transferred to the basic area the interpreter attempts to put it in standard format(i.e. line number,length of text+Enter, Keyword(token), text, etc.). But data stored in the buffer is just ASCII character string(s), not a data structure, and Timex tokens(REM, LET, FOR...NEXT) are not recognized. This confusion on the part of the basic interpreter generates apparent gibberish at the beginning of a line. However, by using the program below, one can see that the buffer
contents and basic program area contents are the same:

```
500 LET N=PEEK 23635+256*23636
501 PRINT N;TAB 10;PEEK N; TAB
    20;CHR$(PEEK N)
502 LET N=N+1
503 GOTO 501
```

*MACRO KEYS

Smart II can handle 14 phone numbers, and attribute a total of 10 macro keys to each phone number. Macros are strings of ASCII characters that can be transmitted by the pressing of one or more keys on your 2068 keyboard. Each macro key can be associated with up to 53 characters. In configuring a macro key string, semicolons are used to denote a carriage return, and the apostrophe(') gives a delay of about one second. Macro keys can be used in so many ways that a list of examples is the best method to trigger the reader's imagination.

>Example 1(Linking macros within dialing directory):

In the section on autodial directory, an example was presented on using one macro key. This was in response to a typical Bulletin Board System dialogue such as:

Name? Larry Carl

Password? Dragon

Now suppose one wishes to send more information to the BBS via the system menu prompts. One way is to capture a complete transmission of the BBS menu's and your response in the Smart II buffer and list contents in the 2040 printer. Use a stopwatch to time the intervals between menu displays. The accumulated data will be useful to configure macro keys to respond to the menu prompts. The following selections from BBS menu's might be selected(options in brackets):

TS 2068 SUBBOARD <2> → READ MESSAGES <R> →

NEW MESSAGES <N> → PAUSE AFTER EACH MSG(Y/N)? <N> → ---

If the same response is entered each time the BBS is dialed, macros can be a time saver. This is done by linking macro keys with the use of the ampersand(&). Using the previous example, we would link macro keys 1 and 2.

```
macro 1:Larry Carl;''Dragon;&2
macro 2:2;''R;'';N'';N
```

In the autodial mode this sequence is transmitted manually on the name prompt by pressing <Shift> and <8> to get menu, and then pressing <1> and <Enter>.

>Example 2(Host operation):

The Smart II software is not a BBS system. Furthermore, the current lack of a T/S 2068 disk storage system curtails the use of random access of files required for a successful BBS. However all is not lost since the posting of messages or bulletins is possible by the use of macro keys. Since the 2050 modem can auto-answer when the phone rings, then the 2068 is equipped to act as a host computer___ a computer other computers can dial into(see section on automatic computer answering). What Smart II expects from a calling computer as a sort of password is a control-E(on 2068

enter <Shift> and <7> to get control, then push <E> key) before data is transmitted. Upon reciept of control-E, Smart II will send macro key zero. However, as discussed previously, macro key zero can be linked to nine other macros to allow composing a message up to 530 characters.

>Example 3(Using macro keys in terminal mode):

The key to logging on and off line in minimum time is to have your purpose together before logging on. Prior planning is the key here. Suppose we had configured macro keys 1 and 2 as shown in example 1. If one wished to leave a text message, macros could be used. Note that the macro key character set is seperate from the buffer. Suppose we want to input the following statement to the message file on a BBS.

```
John, I want to thank
you for the tip on how
to program EPROMS with
the T/S 2068. If only
more brains were available
to unlock all the power
here, we would be home.
```

The statement contains about 165 characters, hence can be covered with three macros as follows:

```
Macro 3:John,I want to thank;
  you for the tip on how to;&4

Macro 4:program EPROMS with the;
  Timex 2068.If only more brains;&5

Macro 5:were available to unlock;
  all the power here, we would be home
```

When the message entry in block entry mode prompt is recieved, enter <Shift> and <8>, then <3>. The message will automatically be transmitted. Of course in order to create more complicated macros, one must study the sign-on formats and note the time between prompts so they can be incorporated within the macro string. Some trial and error may be necessary before one gets it to work perfectly. If the block entry mode is not allowed, then adjustments will be required for line by line entries. In this case, the macro(s) must be sent individually.

*DOWNLOADING

In its simplest terms, downloading is the process of capturing information transmitted to your Timex 2068 from another host computer, using telecommunications hardware and software. Downloading may consist of bagging all or select host computer data, text files, or screen displays. In its easiest form, downloading will mean manually opening and closing the buffer to admit or reject information. When in the terminal mode and a connection with a host is made, hit <Shift> and <8> to cause an interrup at the point of download. Select <D> for the data buffer menu and toggle <B> to open buffer. Hit <Enter> twice to return to the terminal mode and XON. The principal parameter(s) settings should be: BUF:open, DUP:full,LF:off, CR:off, CON:none.

Some BBS have menu options which have download directories for basic programs. Here, the user must carefully observe the protocol. For example, the following protocol options might be displayed after selection of program to be downloaded:

<1>ASCII with buffer control codes
<2>ASCII only, no control codes
<3>CP/M modem protocol

Selecting <1> will cause a download which automatically opens and closes the buffer. Most BBS systems send a <CTRL-R> or <CTRL-T>, respectively to accomplish this.

To save the buffer contents, return to the main menu and push <E> to exit to basic. Use the save command to save buffer contents as normally done for a basic program.

*UPLOADING

Uploading is the sending or transmission of text files, data, programs, graphics, or whatever can be stored in digital form from your 2068 buffer to another 2068, or for storage in a host computer. The path to successful Timex 2068 uploads is knowing the idiosyncracies of each information source or BBS. The following points explain some causes of upload difficulty:

A. Timex basic tokens are located in the latter half of the 256 byte character set. Only the first 128 characters of ASCII are standardized for transmission. Thus Timex tokens are not recognized.

B. Different information hosts have their own protocol methods. One has to learn these differences in order to set parameters correctly; otherwise information recieved by the host will be translated as gibberish!

Because uploading has so many options, we'll only cover a few examples to trigger your imagination. To really understand, one must log on and experiment!

>Example 1(Using <REM> statements):

Press <E> on the main menu to exit to basic program area. Type in text to upload using REM statements. When the buffer is transmitted, the line number and REM token is deleted. For example:

```
 5 REM this message was uploaded from a two line REM statement,
10 REM using the Smart II program.
```

Would be transmitted as

this message was uploaded from a two line REM statement, using the Smart II program.

The parameter settings are:BUF: close, DUP: full, LF: off, CR:off, CON:REM. Select the block entry mode if available to upload text file. Return to buffer menu and press <T> to transmit buffer(Xmit:on). You will get the two prompts(prompt string & character delay)for which you input <Enter> and <0> respectively. Hit <Enter> twice to return to terminal mode and view uploaded message for accuracy.

One curious observation when using the REM method is that Smart II doesn't take kindly to spaces. For a given REM line number, any spaces left between the REM token and text are purged, and the remaining text is left justified upon transmission. This occurance is a hinderance mostly when trying to include graphic illustrations in REM statements within your uploads.

>Example 2(Using macro keys):

Some BBS are not set up to control data flow from a text(block) dump. Instead, the BBS requests line by line entries. If a block buffer dump is transmitted, an XON/XOFF timing discrepancy might occur between your T/S 2068 and the host computer; resulting in the loss of some characters. One way to circumvent this is to use macro keys. In line by line entry one may still have to be concerned about entry line prompts and delays between lines. The section on macro keys explain how to program macro key strings, but experimentation may be necessary to insure accuracy. Parameter settings are: BUF:close, DUP:full, LF:off, CR:off, CON:none. Using the previous text string, we might link two macro keys as follows:

Macro 1:This message was uploaded using two macro keys in;''''';&2

Macro 2:the Smart II program.

When the prompt for the first line entry appears on the screen, press <Shift> and <8> to get menu at bottom of screen. Press <1> and <Enter> to send macro string. The four second pause gives time for the next prompt to occur before macro 2 is transmitted.

>Example 3(Terminal mode):

When Smart II is loaded, one accesses the terminal mode by hitting <Enter> twice. To type a terminal mode message, use the following settings: BUF:open, DUP:half, LF:on, CR: off, CON:none. The data typed will be entered into the buffer. When your message is completed, hit <Shift> and <8> then <m>. From here go to system and buffer menu(s) to make parameter changes for uploading,i.e. BUF:closed, DUP:full, CON:HEX or none. When ready to transmit, toggle Xmit:on. Hit <Enter> twice to return to terminal mode.

>Example 4(2068 to 2068 programs):

When Timex/Sinclair 2068 computers talk, they speak the same language. Therefore its possible to transfer programs between computers. The programs can be run when one exits to basic. The following procedure is used to transfer basic programs:

A. Exit to basic and type or load the basic program to be transmitted.

B. The main protocol parameters are:

	XMIT 2068	RECV 2068
DUP:	half	full
BUF:	closed	open
LF:	on	off
CR:	off	off
CON:	hex	hex

C. Return to buffer menu and transmit. Transmission starts when prompts are answered and <Enter> is hit twice to return to terminal mode. When buffer isviewed, one will see the basic program but no Timex tokens! But all is well; exit to basic and see your basic program in tact and ready to run!

D. In the event one wishes to transfer text files instead of basic programs, then parameter settings should be:CR:off, LF:off, CON:REM. This setting will eliminate the gibberish in the left margin.

GLOSSARY

ASCII--Abrreviation for American Standard for Information Interchange. The standard code used for information interchange among data processing communication systems.

BAUD RATE--The unit of measurement for the speed of information transmission used as Bits per Second.

BINARY--Denoting the numbering system based on the base two. Binary digits are restricted to the values 0 and 1.

BIT--A single digit in a binary number. The digit can only be a 0 or 1.

BPS--Abbreviation for Bits per Second. This is the rate at which computer data moves.

BUFFER--A designated area of RAM memory to temporarily hold data.

BUFFER CONVERSION--Smart II has three types of conversion for entry into the buffer menu. Hex,REM, and None.

*None-No alteration is perfcrmed on anything coming into or transmitted from the buffer. This setting will be used when downloading a text file from one source for viewing or uploading to another source.
*HEX-This mode is selected when uploading or downloading. When DL, the buffer will assume all incoming data is in HEX and a translation rountine(see XLATE tables) will partition the HEX bytes into pairs to represent its ASCII equivalent. For example, "1" and "3" bytes if sent from a host and placed into the buffer would translate into the single byte 13h=CTL-S. The opposite takes place when transmitting from the buffer. This mode is selected so one may send and recieve binary files with an ASCII buffer transmission; providing some degree of standardization.
*REM-This option allows one to enter text lines as REM statements. When loaded into the buffer the timex token is stripped and only the text portion is transmitted. For example:

5 REM Have you hugged your Timex today?

when transmitted from buffer with CON:REM will be sent as

Have you hugged your Timex today?

BYTE-A group of ei8ht Binary digits.

CHARACTER DELAY-The T/S 2068 telecommunications system recieves data asynchronously, i,e. data is transmitted character by character. Sometimes a host computer may require a delay between each byte sent or errors in transmitting may result. If you elect to input a delay(input 1 to 255), that delay in seconds divided by four is added between bytes sent. If the host computer doesn't specify a delay is required in the protocol, hit <Enter>, and you will send the whole buffer without any delays.

DATABASE-The entire body of data having to do with one or more subjects. Typically, it consists of a collection of data files stored in a computer system so that they are readily availble.

DOWNLOADING-Ability to transfer programmed character from a computer to a receptive peripheral device that contains storage RAM for such "Downloading".

FULL DUPLEX-Data is recieved and transmitted on the line in both directions at the same time.

HALF DUPLEX-Data is recieved or transmitted on the line in only one direction at a time.

HARDWARE-The composite of mechanical, electronic, and electrical that combine with the software to comprise a system.

HEXADECIMAL(HEX)-Mathematical numeration system with a base of 16.

INFORMATION-A unit or set of knowledge represented in the form of disctete "words", consisting of an arrangement of symbols(e.g. ASCII code) or binary digits.

MACROS-Strings of characters that can be transmitted by pressing one key on your 2068 keyboard. Smart II enables controlling the logic of Macro transmission by allowing one to program in pauses or creating macros that trigger other macros.

MODEM(MOdulator/DEModulator)The interface between the telephone and dataprocessing system. It translates the analog signals with which the telephone system is comfortable into digital signals with which the computer is comfortable.

PARAMETER-One of a number of variables necessary to control the operation of a program to perform the task desired(for example, the duplex setting is one of the parameters necessary for a data communications program).

PARITY BIT-A supplementary bit added to an information word to make the total of one-bits always odd or even. In ASCII seven bits are used to represent the value of a character and the eighth bit is for parity. Permits checking accuracy of info transfers.

PHREAKING-A slang term related to non-legitimate uses of telecomputing. Typical involvements include:prank playing,system-cracking,using profane language,attempting to crash a BBS.

PROMPT-A character(s) or symbol that the host computer displays at the beginning of each new line when it is ready to recieve more data or text. Examples are: ? or : or < or ! or * .

PROTOCOL-The rules and formats for conducting communications between two or more computers.

RAM(Random Access Memory) -Memory storage area for data and programs. Data can be read from or written into RAM memory locations. Most user programs are stored in RAM. This memory is volatile in the information in RAM is lost when the computers power is turned off.

ROM(Read Only Memory)-A memory circuit written to that cannot be altered by a user. The memory is non-volatile in that it is retained when the power is turned off. For the TS 2068 , ROM contains the operating system and BASIC interpreter.

SMART TERMINAL-Terminal software that permits uploading and downloading text files, Basic and Machine Code programs, autodialing, buffer storage, translation tables, etc.

SOFTWARE-Programs and routines which instruct and control computer operations.

TERMINAL EMULATION-Software that allows your computer to mimic different computer models, such as required by mainframe computers(e.g. DEC VT 100/VT52, IBM 3278). Principle features include control codes, cursor positioning, etc.

TOKEN-As applied to Timex computers, keywords and functions(e.g. PRINT, SIN, PEEK, GOTO) stored in ROM; with each "token" consuming one byte of memory.

TRANSLATION-To take media in one language and make it understandable in another language.

XMODEM-A method of protocol(also called ACK-NAK) which allows for error checking of information transfers.

XOFF-Abbreviation for "transmitter off". A signal sent by a reciever to a transmitter, telling it to stop sending. On the TS 2068, enter the <Shift-8> key combination, or <Shift-7> key combination followed by <S> key.

XON-Abbrevation for "transmitter on". A signal sent by a reciever to a transmitter, telling it to resume transmission. On the TS 2068, enter the <Shift-7> key combination followed by <Q> key.

APPENDIX A(HINTS & TIPS)

>When displaying the buffer menu and <V> key is pressed, the display V:Display/Printer (D,P)?_ prompt appears. If <D> is pressed to view the buffer then hit the space bar to stop scroll, and <Enter> to resume. If <P> is pressed, then holding the space bar will interrup 2040 printer and scroll display . Release the bar and printing will resume.

>Smart II has built into it an autobuffer(host computer has ability to automatically open and close buffer). Certain host terminal programs have the capacity to toggle the Smart II buffer open(control-R sent) when downloading programs. After the last character is sent, a control-T is sent to close buffer. When data is being downloaded, the 2068 user can sometimes manually close the buffer with a control-C entry(<Shift> and <7> then <C>).

>The Basic program area is linked to the buffer storage. A Basic program is automatically input to the buffer regardless of buffer status. If the Basic program is purged, The buffer used(BUFUSD) is cleared also and vice-versa.

>To break from XLATE tables and return to system menu, press <C aps shift> and <Break>, then hold momentarily.

>When uploading to a BBS, try changing parity and/or stop bits if you are loosing characters during a transmission.

>Store fixed Smart II settings on seperate tape datafiles as a precaution in event of data lost. Don't fill buffer to capacity if saving buffer is intended. Leave 4 to 5K bytes for Save routine workspace.

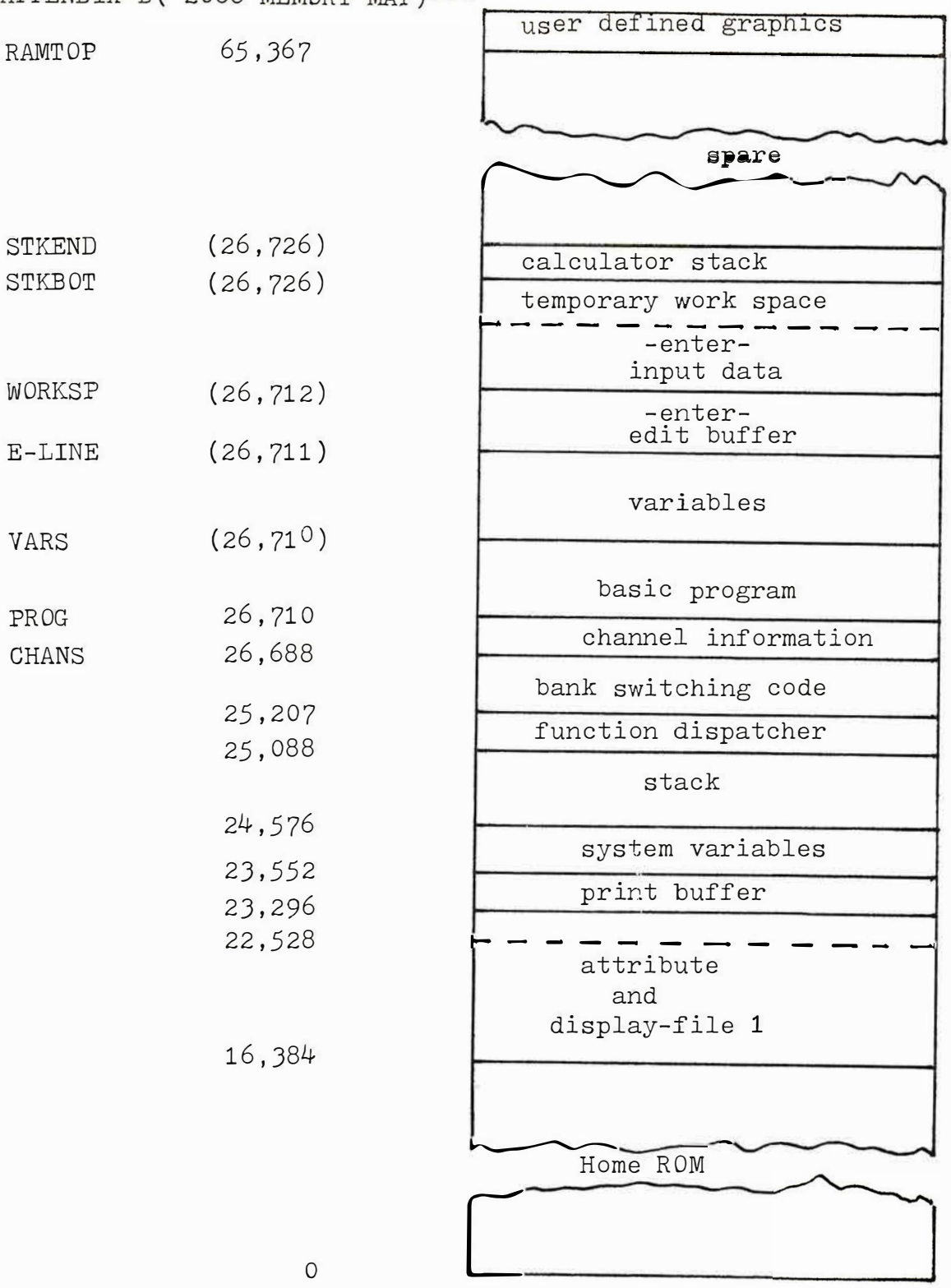
>Twenty-two rows of text are allowed in terminal mode. If you type message in terminal mode make sure buffer is open, otherwise data will be lost.

>If you exit to Basic from terminal mode, then when you return with Print USR 54016, the terminal mode display will be cleared.

>When transmitting an upload, hit <Enter> to get terminal mode prompt, wait about 10-20 seconds and hit <Shift> and <8> to return to buffer menu and view BUFXMT. Depending on file length, it should be equal to BUFUSD. If not, repeat the above(a speaker phone allows hearing Xmission). When all buffer contents are uploaded, hit <Enter> twice to get back to host.

>To return to main menu from other display modes(e.g. macro settings, XLATE tables) hit <Break> and <Caps shift> keys.

APPENDIX B(2068 MEMORY MAP)



NOTE: Numbers in parenthesis represent initial values for system variables at switch on.

APPENDIX C(AUTORUN PROGRAM)

Smart II is a machine code program and has been configured to be loaded as follows:

Type in Load "" Code 54016

Then press play on your recorder. It takes about 50 seconds to load. When 0 OK, 0:1 appears signaling a successful load, type

Print USR 54016 <Enter>

The above method can be simplified by the following:

A. With Smart II loaded, exit to basic and type in the following basic program:

```
1 REM mterm

3 Load "mterm" Code 54016

5 Print USR 54016
```

B. Put in a fresh cassette and save above program with Save "mterm" Line 1.

C. Save Smart II on same cassette by Save "mterm" Code 54016,7721 and <Enter>.

When the save is completed, this will be your working Smart II tape. To load just type Load "" and <Enter>.

One point of observation when using the autorun program option. The basic program area will contain 54 bytes of data due to the three(3) line basic program above;and so will the Smart II buffer(before screening by XLATE tables). At this point its advisable to go to the buffer menu and erase the contents. The reasoning being that data entered in the terminal mode or captured during a download will be appended to the existing buffer contents. No harm will be done by eliminating the unnecessary program lines after Smart II is loaded.

APPENDIX D(TRANSLATION TABLES)

The translate(XLATE) tables are the interpretive means by which the Timex 2068 & 2050 modem can communicate in a standardized telecommunications "tongue". When two 2068's are talking, no problem exists. However, some BBS or other computer types may require translation of signals transmitted by the Timex system. The 2068 basic character set is not standard ASCII . Smart II effectively reconfigures the Timex 2068 keyboard so that the Timex character codes 0 to 31 are redefined for use as control or communication functions. The XLATE tables are used to insure that all the telecommunications sources are speaking the same. Smart II has four translate tables, accessible from the system menu by pressing <T> option; which gives the following prompt:

T:Which table(K,D,I,O)?_

K-Converts keyboard input to ASCII.

D-Converts incoming information for display to ASCII.

I-Converts incoming information to ASCII.

O-Converts outgoing information to ASCII.

As initially configured, Smart II tables D,I,O are the same. The multi-key definitions of the Timex 2068 keyboard versus standard QWERTY type keyboards is responsible for the radical differences in table K. The first half of the keyboard XLATE tables contain numerials(0 to 9) and upper & lower cases of alphebet. The keyboard conversion tables are arranged in the manner the CPU scans the 2068 keyboard. Keys are scanned starting at the lower left half row of keyboard(Data lines D0-D4) upward and counterclockwise; ending with the row sequence:space, symbol shift, M, N, and B. All bytes(shown in hexidecimel) in the XLATE tables can be altered as required. To change a byte, the following prompt is answered:

T:Byte=Change?_

The XLATE tables are numbered consecutively from left to right, row by row. XLATE table 2 corresponds to the format the 2068 basic character set is stored in ROM. All incoming ASCII characters are screened by this lookup table. To specify a change, enter the byte code as hex,comma,then the new byte. For example:

Suppose CTRL-G(07 hex) is recieved by Smart 2; triggering the Bell prompt. You find the audible prompt annoying and the BBS provides no means to cancel it. One method is to select XLATE table I and input (07,00). This will Zap the bell prompt. This procedure is also useful if you want to change a keypress to send different values prompted by protocol requirements of the host computer. In this instance, table K is selected. For the majority of users the XLATE tables will remain unchanged.

APPENDIX E(SCREEN DISPLAY UPLOADS)

Did you ever get the urge to transmit a picture instead of strings of characters during an upload? They say a picture is worth a thousand words! This section will explain a method to upload screen displays(e.g. drawings, graphics) using the Screen$ function.

Unlike the basic program area, the Timex/Sinclair 2068 primary display and attribute file is a fixed length in RAM, and does not vary its location. The starting address is 16384 and ends at 23295. The method used for displaying T/S 2068 character(s) is rather involved , and does not lend itself to direct <Peek>ing the screen to find a given character. Use of the <Poke> command is also prohibitive. To put a character code at a specific point on the screen, its recommended one use the <Print At> command. To view the location of this code use the Screen$ function. For example, <Print Screen$(10,15)> will return the character printed in center of screen. The following procedure will provide Screen$ uploads, with CON set to HEX:

A.Type in or load basic program. The following short program of a spiral cone can be used to experiment:

```
 1 REM cone
 5 Border 0:Paper 0:CLS
10 LET Y=30
20 LET X=30 TO 180 STEP 10
30 LET Z=(6*RND)+1
40 CIRCLE INK Z:X,Y,Y-25
50 LET Y=Y+4:NEXT X
60 PAUSE 0
```

Run the above program and save the display with the command: Save"cone"Screen$.

B.Load your Smart II program. The trick is to load the display bytes in the BASIC program area(buffer), then POKE each byte into the display file where the display will be shown on the screen. Prior to accomplishing this, the boundaries of the basic program area must be fixed so the area contains the same number of bytes as the display file(this boundary is designated as VARS; whose location can be found at address 23627 in the Systems Variable Area). This is done by exiting to BASIC and entering the following command WITHOUT line number:

```
POKE 23627,33620-256*INT( 33620/256):
POKE 23628,INT(33620/256)
```

The above entry is the method used to POKE 16 bit numbers or data into addresses. The general form is

```
Let T= INT(data/256)

POKE address,data-T*256:

POKE address+1,T
```

If an OK is displayed, then return to Smart II with <Print USR 54016> and check BUFUSD= 6923 or thereabout. If not, then exit to BASIC and repeat the above POKE.

C.If BUFUSD equals the approximate bytes in display file, then exit to basic and load your display with <LOAD "cone" CODE 26710>. This places the display in the BASIC program area(Smart II buffer) so it can be transmitted . Return to Smart II, and transmit buffer. Set CON:Hex.

D.When the upload has been completed, the recipient of the upload will exit to BASIC and dump his buffer contents to the display file with the following basic command entered with NO line number:

```
For L=16384 To 23294:POKE L,
PEEK( L+10326):NEXT L
```

TRANSLATION TABLE(K)

00	00 7A 78 63 76 61 73 64	
08	66 67 71 77 65 72 74 31	
10	32 33 34 35 30 39 38 37	<LOWER CASE
18	36 70 6F 69 75 79 0D 6C	
20	6B 6A 68 20 00 6D 6E 62	
28	00 00 00 00 00 00 00 00	
30	00 00 00 00 00 00 00 00	
38	00 00 00 00 00 00 00 00	
40	00 5A 58 43 56 41 53 44	
48	46 47 51 57 45 52 54 7B	
50	7C 7D 7E 7F 08 E7 FE 00	<UPPER CASE
58	00 50 4F 49 55 59 FC 4C	
60	4B 4A 48 FD 00 4D 4E 42	
68	00 00 00 00 00 00 00 00	
70	00 00 00 00 00 00 00 00	
78	00 00 00 00 00 00 00 00	
80	00 3A 60 3F 2F 00 00 5C	
88	00 00 00 00 00 3C 3E 21	
90	40 23 24 25 5F 29 28 27	<SYMBOLS SHIFT
98	26 22 3B 00 5D 5B 1B 3D	
A0	2B 2D 5E FD 00 2E 2C 2A	
A8	00 00 00 00 00 00 00 00	
B0	00 00 00 00 00 00 00 00	
B8	00 00 00 00 00 00 00 00	
C0	00 1A 18 03 16 01 13 04	
C8	06 07 11 17 05 12 14 1B	
D0	1C 1D 1E 1F 00 00 00 00	<CONTROL CODES
D8	00 10 0F 09 15 19 FC 0C	
E0	0B 0A 08 FD 00 0D 0E 02	
E8	00 00 00 00 00 00 00 00	
F0	00 00 00 00 00 00 00 00	
F8	00 00 00 00 00 00 00 00	

TABLE 1

TRANSLATION TABLE(D,I,O)

00	00	01	02	03	04	05	06	07
08	08	09	0A	0B	0C	0D	0E	0F
10	10	11	12	13	14	15	16	17
18	18	19	1A	1B	1C	1D	1E	1F
20	20	21	22	23	24	25	26	27
28	28	29	2A	2B	2C	2D	2E	2F
30	30	31	32	33	34	35	36	37
38	38	39	3A	3B	3C	3D	3E	3F
40	40	41	42	43	44	45	46	47
48	48	49	4A	4B	4C	4D	4E	4F
50	50	51	52	53	54	55	56	57
58	58	59	5A	5B	5C	5D	5E	5F
60	60	61	62	63	64	65	66	67
68	68	69	6A	6B	6C	6D	6E	6F
70	70	71	72	73	74	75	76	77
78	78	79	7A	7B	7C	7D	7E	7F
80	80	81	82	83	84	85	86	87
88	88	89	8A	8B	8C	8D	8E	8F
90	90	91	92	93	94	95	96	97
98	98	99	9A	9B	9C	9D	9E	9F
A0	A0	A1	A2	A3	A4	A5	A6	A7
A8	A8	A9	AA	AB	AC	AD	AE	AF
B0	B0	B1	B2	B3	B4	B5	B6	B7
B8	B8	B9	BA	BB	BC	BD	BE	BF
C0	C0	C1	C2	C3	C4	C5	C6	C7
C8	C8	C9	CA	CB	CC	CD	CE	CF
D0	D0	D1	D2	D3	D4	D5	D5	D7
D8	D8	D9	DA	DB	DC	DD	DE	DF
E0	E0	E1	E2	E3	E4	E5	E6	E7
E8	E8	E9	EA	EB	EC	ED	EE	EF
F0	F0	F1	F2	F3	F4	F5	F6	F7
F8	F8	F9	FA	FB	FC	FD	FE	FF

TABLE 2

ASCII CONTROL SYMBOLS

SYMBOL	CTRL	MEANING
NUL	@	NULL(BLANK)
SOH	A	START OF HEADER
STX	B	START OF TEXT
ETX	C	END OF TEXT
EOT	D	END OF XMISSION
ENQ	E	ENQUIRY
ACK	F	ACKNOWLEDGE(+)
BEL	G	BELL
BS	H	BACKSPACE
HT	I	HORZ TAB(8 SP)
LF	J	LINE FEED
VT	K	VERTICAL TAB
FF	L	SCREEN SCROLL UP
CR	M	CARRIAGE RETURN
SO	N	CURSOR ON
SI	O	CURSOR OFF
DLE	P	HALT(BREAK)
DC1	Q	START(XON)
DC2	R	OPEN BUFFER
DC3	S	STOP(XOFF)
DC4	T	CLOSE BUFFER
NAK	U	ACKNOWLEDGE(-)
SYN	V	SYNCHRONIZATION
ETB	W	END TEXT BLOCK
CAN	X	CURSOR LEFT 1 COLUMN
EM	Y	CURSOR RIGHT 1 COLUMN
SUB	Z	CURSOR DOWN 1 LINE
ESC	1 THEN	
	CAP A	CURSOR UP 1 LINE
FS	2	CURSOR HOME TO FIRST SCREEN POSITION
GS	3	CURSOR TO START OF SAME LINE
RS	4	ERASE TO END OF LINE
US	5	ERASE TO END OF SCREEN.

NOTE: The <Shift-7> key press on T/S 2068 is equivalent to a control(CTRL) key press.

TABLE 3

*** BIBLIOGRAPHY***

Boles, Andy. "Keyboard Scanning". SYNTAX(February 1984).

Epson America. "Epson User's Manual". Torrance,Calif. 1983.

Lawrence,David. "The Working Timex Sinclair 2068". Morris Plains,New Jersey. Creative Computing Press. 1984.

Levitan,Arlan R. "Telecomputing Today". Compute!'s PC & PCjr(September 1984):48-53.

Mazur,Jeff. "Timex Sinclair 2068 Intermediate/Advanced Guide. Indianapolis,Indiana. Howard W. Sams & Co. 1984.

Niles,Jack M. "Micros and Modems. Reston,Virginia: Reston Publishing, 1983.

Schwaderer,W. David. "Digital Communications Programming on the IBM PC". New York, John Wiley & Sons. 1984.

Stoner,Don. "Compute!'s Personal Telecomputing". Greensboro,North Carolina. Compute! Publications. 1984.

Valentine,Roger. "The Timex Sinclair 2068". John Wiley & Sons. 1983.

Westridge Communications. "Software Manual MTERM Software for the Timex/Sinclair 2068 Personal Computer". Van Nuys, Calif. 1983.

NOTES

BULLETIN BOARD DIRECTORY

BBS NAME	PHONE NUMBER	PASSWORD

MTERM COMBINED HEXIDECIMEL/ASCII TABLE
<K>EYBOARD TRANSLATION

00	00 o	7A z	78 x	63 c	76 v	61 a	73 s	64 d
08	66 f	67 g	71 q	77 w	65 e	72 r	74 t	31 1
10	32 2	33 3	34 4	35 5	30 0	39 9	38 8	37 7
18	36 6	70 p	6F o	69 i	75 u	79 y	0D CR	6C l
20	6B K	6A j	68 h	20 SP	00 o	6D m	6E n	62 b
40	00 0	5A Z	58 X	43 C	56 V	41 A	53 S	44 D
48	46 F	47 G	51 Q	57 W	45 E	52 R	54 T	7B
50	7C |	7D }	7E "	7F ©	08	E7 NU	FE ①	00 0
58	00 0	50 P	4F O	49 I	55 U	59 Y	FC CR	4C L
60	4B K	4A J	48 H	FD NU	00 0	4D M	4E N	42 B
	0	1	2	3	4	5	6	7

LOWER CASE

UPPER CASE

NU–NOT USED

① –MTERM MENU

MTERM COMBINED HEXIDECIMEL/ASCII TABLE
<K>EYBOARD TRANSLATION

80	00 0	3A :	60 £	3F ?	2F /	00 0	00 0	5C \
88	00 0	00 0	00 0	00 0	00 0	3C <	3E >	21 !
90	40 @	23 #	24 $	25 %	5F _	29)	28 (	27 /
98	26 &	22 "	3B ;	00 0	5D]	5B [	1B NU	3D =
A0	2B +	2D –	5E ^	FD NU	00 0	2E .	2C ,	2A *
C0	00 0	1A SUB	18 CAN	03 ETX	16 SYN	01 SOH	13 DC3	04 EOT
C8	06 ACK	07 BEL	11 DC1	17 ETB	05 ENQ	12 DC2	14 DC4	1B ESC
D0	1C FS	1D GS	1E RS	1F US	00 0	00 0	00 0	00 0
D8	00 0	10 DLE	0F SI	09 HT	15 NAK	19 EM	FC ②	0C FF
E0	0B VT	0A LF	08 BS	FD CLEAR	00 0	0D CR	0E SO	02 STX
	0	1	2	3	4	5	6	7

SYMBOLS SHIFT

CONTROL CODES

NU–NOT USED

② –MTERM PROMPT